

What is claimed is:

1. A microwave sintering furnace comprising,
a source of microwave radiation;
a chamber, coupled to receive the microwave radiation, in which green parts may be sintered by the microwave radiation; and
a container for holding the green parts during sintering within the chamber, the container being comprised predominately of one or more materials each having an ability to withstand thermal shock that is greater than that of alumina.
2. The microwave sintering furnace of claim 1, wherein each of the one or more materials is selected from the group of silicon nitride, alloys of silicon nitride, hexagonal boron nitride and low thermal expansion ceramics.
3. The microwave sintering furnace of claim 1, wherein the one or more materials includes an alloy comprised of silicon nitride and aluminum oxide.
4. The microwave sintering furnace of claim 1, further including a structure for transporting in a substantially continuous fashion the container through the chamber.
5. The microwave sintering furnace of claim 4, wherein the structure is comprised of one or more materials, at least one of which is a material having an ability to withstand thermal shock greater than that of alumina.
6. The microwave sintering furnace of claim 4, wherein the structure is comprised predominately of one or more materials selected from the group of silicon

nitride, alloys of silicon nitride, hexagonal boron nitride and low thermal expansion ceramics.

7. The microwave sintering furnace of claim 6, wherein the structure is in the form of a tube, and the container is in the form of a crucible, and wherein there are a plurality of crucibles stacked end to end in the tube.

8. The microwave sintering furnace of claim 7, wherein the tube is comprised of one or more materials, at least one of which is a material having thermal shock resistance greater than that of alumina.

9. The microwave sintering furnace of claim 4, wherein the structure is comprised predominately of an alloy comprised of silicon nitride and aluminum oxide.

10. A method for sintering parts using microwaves, comprising:
placing at least one part to be sintered into a container; and
subjecting the part to microwave radiation;
wherein the container is comprised predominately of one or more materials each having an ability to withstand a thermal shock greater than that of alumina.

11. The method of claim 10, wherein each of the one or more materials is selected from a group consisting essential of silicon nitride, alloys of silicon nitride, hexagonal boron nitride and low thermal expansion ceramics.

12. The method of claim 10, wherein the one or more materials include an alloy comprised of silicon nitride and aluminum oxide.

13. The method of claim 10, further including transporting in a substantially continuous fashion the container through the chamber using a structure that extends through the chamber.

14. The method of claim 13, wherein the structure is comprised predominately of one or more materials, at least one of which is a material having an ability to withstand thermal shock greater than that of alumina.

15. The method of claim 13, wherein the structure is comprised of one or more materials, at least one of which is a material selected from the group of silicon nitride, alloys of silicon nitride, hexagonal boron nitride and low thermal expansion ceramics.

16. A crucible for carrying green parts during microwave sintering comprised of one or more materials each having a thermal shock resistance substantially greater than that of alumina.

17. The crucible of claim 16, wherein each of the one or materials is selected from a group consisting essentially of silicon nitride, alloys of silicon nitride, hexagonal boron nitride and low thermal expansion ceramics.

18. The crucible of claim 16, wherein the one or more materials includes an alloy comprised of silicon nitride and aluminum oxide.

19. A microwave sintering furnace comprised of:
a source of microwave radiation;
a chamber coupled to receive the microwave radiation, for sintering green parts;

an elongated structure extending through the chamber for transporting containers carrying green parts through the chamber in a substantially continuous fashion, the elongated structure being comprised of one or more materials, at least one of which is a material having an ability to withstand thermal shock greater than that of alumina.